Installation and Operating Instructions for ROBA-stop®-silenzio® Type 896._ _ _._ _ Sizes 4 – 1800

(B.8.7.GB)

Please read the Operational Instructions carefully and follow them accordingly!
Ignoring these Instructions may lead to lethal accidents, malfunctions, brake failure and damage to other parts.

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Manufacturer's Declaration

This product is intended for installation in a machine or system, based on the machine directive 98/37/EC.
It is forbidden to start use of the product until the machine or system into which it should be built is operating in accordance with the EC directives.

The product corresponds to the low voltage directive 73/23/EEC.

The product corresponds to the elevator directive 95/16/EC

The customer is responsible for compliance with the EMC directive 89/336/EEC.

Please Observe:
According to German notation, decimal points in this document are represented with a comma (e.g. 0,5 instead of 0.5).

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Sizes 4 – 1800

(B.8.7.GB)

Safety Regulations

These Safety Regulations are user hints only and may not be complete!

Danger!
Danger of death! Do not touch voltage-carrying cables and components.

To prevent injury or damage, only professionals and specialists should work on the devices.

Danger!

This warning applies if:

- ❒ the electromagnetic brakes are used incorrectly.
- ❒ the electromagnetic brakes are modified.
- ❒ the relevant standards for safety and / or installation conditions are ignored.

Warning!
Before product installation and initial operation, please read the Installation and Operational Instructions carefully and observe the Safety Regulations. Incorrect operation can cause injury or damage.
The electromagnetic brakes have been developed in accordance with the latest technology regulations and are, at the point of delivery, operationally safe.

Warning:
Without a conformity inspection, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on the directive 94/9/EC (ATEX directive).

Please Observe!

- ❒ Only specialists who are trained in the transport, installation, operation, maintenance and general operation of these devices and who are aware of the relevant standards should be allowed to carry out this work.
- ❒ Technical data and specifications (Type tags and documentation) must be followed.
- ❒ The correct connection voltage must be connected according to the Type tag.
- ❒ Never loosen electrical connections or carry out installations, maintenance or repairs while the voltage connection is energised!
- ❒ Cable connections must not be placed under mechanical strain.
- ❒ Check electrical components for signs of damage before putting them into operation. Never bring them into contact with water or other fluids.
- ❒ The braking torque is lost if the friction lining and / or the friction surface come into contact with oil or grease.

Appointed Use

mayr®-brakes are for use in machines and systems and must only be used in the situations for which they are ordered and confirmed. Using them for any other purpose is not allowed!

Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directives 89/336/EEC, the individual components produce no emissions. However, functional components e.g. rectifiers, phase demodulators, ROBA®-switch devices or similar controls for mains-side energisation of the brakes can produce disturbance which lies above the allowed limit values.
For this reason it is important to read the Installation and Operational Instructions very carefully and to keep to the EMC directives.

Device Conditions

The catalogue values are standards which can, in certain cases, vary. When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, run-in behaviour and wear as well as general ambient conditions can all affect the given values. These factors should therefore be carefully assessed, and alignments made accordingly.

Please Observe!

- ❒ Mounting dimensions and connection dimensions must be adjusted according to the size of the brake at the place of installation.
- ❒ The brakes are designed for a relative duty cycle of 100 %.
- ❒ The brakes are only designed for dry running. The braking torque is lost if the friction surfaces come into contact with oil, grease, water or similar substances.
- ❒ The braking torque is dependent on the present run-in condition of the brakes.
- ❒ Manufacturer-side corrosion protection of the metallic surface is provided.

Protection Class I

This protection can only be guaranteed if the basic insulation is intact and if all conductive parts are connected to the PE conductor. Should the basic insulation fail, the contact voltage cannot remain (VDE 0580).

Protection (Mechanical) IP 10:

Protected against large body surfaces and against large foreign bodies > 50 mm diameter. Not waterproof.

Protection (Electrical) IP 54:

Dust-proof and protected against contact as well as against splashing water from all directions.

Ambient Temperature –20 °C up to +40 °C

Warning!

At temperatures of around or under freezing point, condensation can strongly reduce the torque. During longer downtimes, the friction linings can stick to the friction surfaces.
The user is responsible for taking appropriate countermeasures.

Thermic Class F (+155 °C)

The magnetic coil and the casting compound are suitable for use up to a maximum operating temperature of +155 °C.

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Safety Regulations

These Safety Regulations are user hints only and may not be complete!

User-implemented Protective Measures:

- ❑ Please cover moving parts to protect against injury through seizure and catapulted objects.
- ❑ Place a cover on the magnetic part to protect against injury through high temperatures.
- ❑ Protect against electric shocks by installing a conductive connection between the magnetic component and the PE conductor on the permanent installation (Protection Class I) and by carrying out a standardised inspection of the continuous PE conductor connection to all contactable metal parts.
- ❑ Protect against highly inductive switch-off peaks by installing varistors, spark quenching units or similar devices according to VDE 0580/2000-07, Paragraph 4.6, to prevent damage to the coil insulations or switch contact consumption in extreme conditions (this protection is contained in *mayr*® rectifiers).
- ❑ Install additional protective measures against corrosion if the brake is subject to extreme ambient conditions or is installed in open air conditions, unprotected from the weather.
- ❑ Take precautions against freeze-up of the armature disk and the rotor in high humidity and at low temperatures.

Regulations, Standards and Directives Used:

98/37/EC	Machine directive
73/23/EEC	Low voltage directive
89/336/EEC	EMC directive
95/16/EC	Elevator directive
EN 81-1	Safety directives for construction and installation of elevators and small goods elevators
BGV C1	(Previously VGB 70) safety directive for theatre stage technical systems
DIN VDE 0580	Electromagnetic devices and components, general directives

Please Observe the Following Standards:

DIN EN ISO 12100-1 and 2	Machine safety
DIN EN61000-6-4	Noise emission
EN12016	Interference immunity (for elevators, escalators and moving walkways)
EN60204	Electrical machine equipment

Liability

- ❒ The information, guidelines and technical data in these documents were up to date at the time of printing.

  Demands on previously delivered brakes are not valid.
- ❒ Liability for damage and operational malfunctions will not be taken if
  - the Installation and Operational Instructions are ignored or neglected.
  - the brakes are used inappropriately.
  - the brakes are modified.
  - the brakes are worked on unprofessionally.
  - the brakes are handled or operated incorrectly.

Guarantee

- ❒ The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG Sales and Delivery Conditions.
- ❒ Mistakes or deficiencies are to be reported to *mayr*® at once!

Conformity Markings

The product conforms to the CE according to the low voltage directive 73/23/EEC.

Identification

mayr® components are clearly marked and described on the Type tag:

Manufacturer

***mayr*®**

Product name / Type

Article number

Serial number

TÜV (Technical Inspectorate) License:

The installation sizes 200 to 1800, with a microswitch for release monitoring, were prototype-inspected by the Southern German Technical Inspectorate (TÜV) for their effect as a brake assembly on the drive sheave shaft and as part of the protective assembly against excessive upward-moving cage speeds.

Design	License number
Double brake	ABV 760/1
Single brake	ABV 761/1

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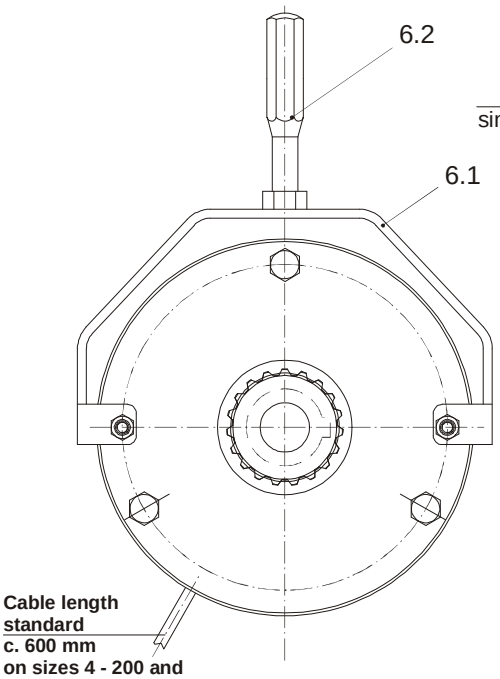

Fig. 1

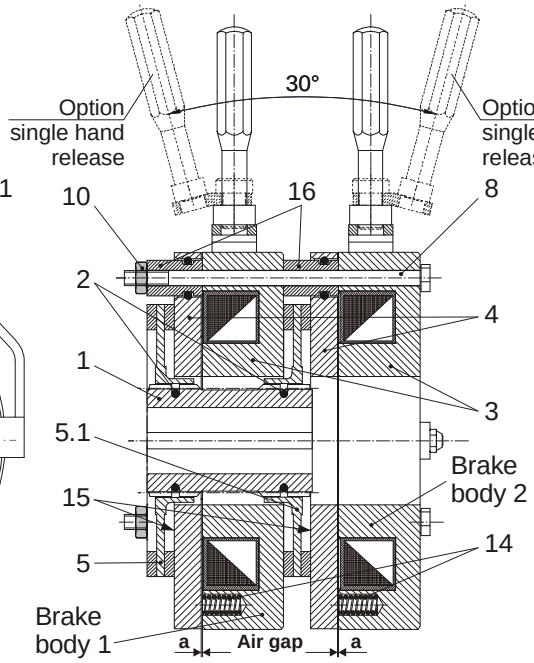

Fig. 2

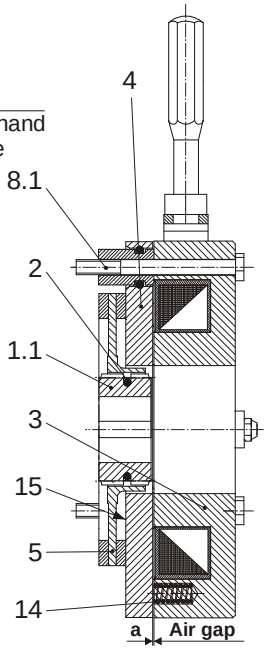

Fig. 3
(Single brake)

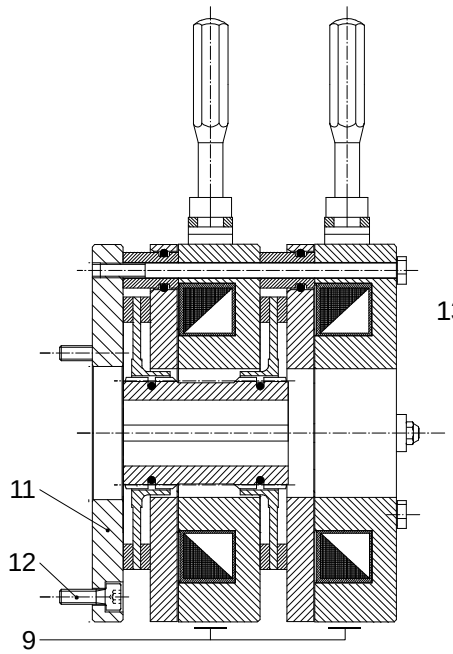

Fig. 4

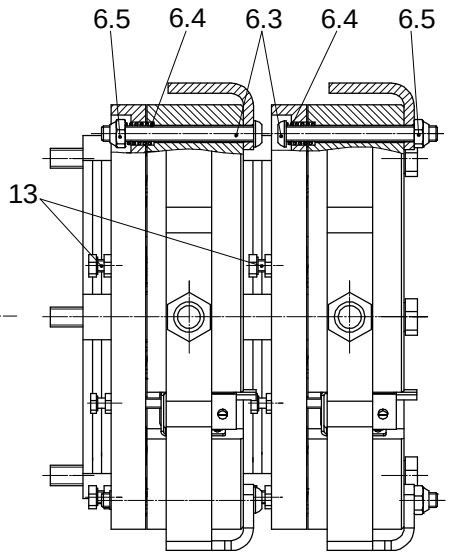

Fig. 5

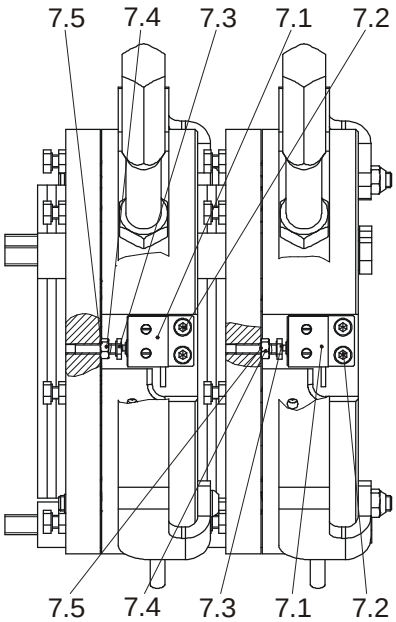

Fig. 6

Safety and Guideline Signs

Danger!
Danger of injury to personnel and damage to machines.

Guidelines!
Guidelines on important points.

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Parts List *(Only use mayr® original parts)*

1	**Hub assembly with 2 O-rings (2)**	**6.3**	**Raised head screw**	**8**	**Hexagon head screw**
1.1*	**Hub assembly with 1 O-ring (2)**	**6.4**	**Thrust spring**	**8.1****	**Hexagon head screw**
2	**O-ring**	**6.5**	**Hexagon nut**	**9**	**Type tag**
3	**Coil carrier assemblies 1 and 2**	**7.**	**Release monitoring assembly**	**10**	**Shipping brace (3x)**
4	**Armature disks 1 and 2**	**7.1**	**Microswitch**	**11**	**Flange plate**
5	**Rotor 1**	**7.2**	**Cap screw**	**12**	**Cap screw**
5.1	**Rotor 2**	**7.3**	**Hexagon head screw**	**13**	**Noise damping**
6	**Hand release assembly**	**7.4**	**Hexagon nut**	**14**	**Thrust spring**
6.1	**Switch bracket**	**7.5**	**Spring washer**	**15**	**Shoulder screw**
6.2	**Hand release rod**			**16**	**Distance bolt**

***** Only on single brake designs

****** sizes 4 – 300 only on single brake designs

Technical Data

Nominal voltages:	24 V/104 V/180 V/207 V
Protection (electrical)	IP54
Protection (mechanical)	IP10
Duty Cycle:	100 %
Connection:	2 x 0,88 mm²
Ambient temperature:	-20 °C up to +40 °C

Table 1: Technical Data (dependent on size)

Size	Braking torque (Tolerance +60 %) [Nm]			Maximum speed [rpm]	Electrical nominal power [W]	Mass [kg]	Hand release force per lever at nominal torque c. [N]	Switching times at nominal braking torque 100 %		
	Nominal torque 100 % Type 896._0_._ _	Increased torque 120 % Type 896._1_._ _	Reduced torque 75 % Type 896._2_._ _					Separation t_2 [ms]	Connection t_1 (AC) [ms]	Connection t_1 (DC) [ms]
4	2 x 4	2 x 5	2 x 3	4500	2 x 23	2 x 1,4	35	52	135	33
8	2 x 8	2 x 10	2 x 6	3500	2 x 27	2 x 2,8	35	70	196	39
16	2 x 16	2 x 19	2 x 12	2900	2 x 33	2 x 3,5	110	94	398	99
32	2 x 32	2 x 40	2 x 26	2500	2 x 45	2 x 5,5	100	120	518	118
64	2 x 64	2 x 77	2 x 43	2300	2 x 55	2 x 7,75	130	174	477	107
100	2 x 100	2 x 120	2 x 80	2000	2 x 63	2 x 10,75	110	234	488	105
200	2 x 200	2 x 235	2 x 157	1700	2 x 78	2 x 17	200	270	968	185
300	2 x 300	2 x 360	2 x 225	1500	2 x 86	2 x 24	250	308	1087	246
500	2 x 500	2 x 600	2 x 380	1300	2 x 90	2 x 30	300	444	1023	193
800	2 x 800	2 x1000	2 x 600	1150	2 x 107	2 x 46	300 ***	581	1231	267
1300	2 x 1300	2 x 1560	2 x 980	1000	2 x 130	2 x 63	320 ***	589	1464	266
1800	2 x 1800	2 x 2150	2 x 1350	900	2 x 150	2 x 79	350 ***	850	1920	420

*** Release of both brakes simultaneously using a lever

Guidelines for Single Brakes

The ROBA-stop®-silenzio® brake can also be ordered as a single brake. In this case, the individual values for braking torque, electrical nominal power and mass apply.

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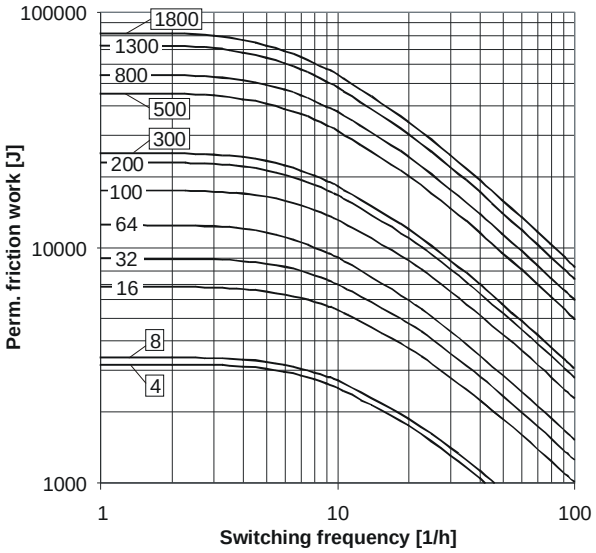
Friction Performance Diagram
with n = 1500 rpm for sizes 4 to 300
with n = 750 rpm for sizes 500 to 1800



State of Delivery

Please check the state of delivery immediately!
mayr® will take no responsibility for belatedly returned goods.
Please report transport damage immediately to the deliverer.
Please report incomplete delivery and obvious defects immediately to the manufacturer.

Application

As holding brake with emergency OFF brakings

- ❒ **In closed rooms**
  (only usable in tropical areas, in high humidity, with long downtimes and in sea climates after special measures have been taken)!
- ❒ **Dry running**
- ❒ **Installation position horizontal and vertical**
- ❒ **In clean ambient conditions**
  (coarse-grained dust as well as liquids of all kinds affect the braking function ⇒ cover the device).

Function

The ROBA-stop®-silenzio® is designed as a double brake in which two brake bodies working independently of one another ensure high operational safety.
The braking torque in brake body 1 (3) is produced via the pressure force of several thrust springs (14) using frictional locking between the two rotor friction linings (5), the armature disk 1 (4) and the flange plate (11) or machine wall.
The braking torque in brake body 2 (3) is produced via the pressure force of several thrust springs (14) using frictional locking between the two rotor friction linings (5.1), the armature disk 2 (4) and the coil carrier 1 (2).
The brake is released electromagnetically.

Installation Conditions

- ❑ The eccentricity of the shaft end in relation to the mounting pitch circle may not exceed 0,2 mm.
- ❑ The position tolerance of the threads for the hexagon head screws (8 or 8.1) may not exceed 0,2 mm.
- ❑ The axial run-out deviation of the screw-on surface to the shaft may not exceed the permitted axial run-out tolerance of **0,04 mm** on sizes 4 and 8, **0,05 mm** on sizes 16 to 300, and **0,063 mm** on sizes 500 to 1800 according to DIN 42955 R. The related diameter is the pitch circle diameter to the brake attachment.
  Larger deviations can lead to a drop in torque, to continuous slipping on the rotors and to over-heating.
- ❑ The tolerances of the hub (1 or 1.1) and the shaft are to be chosen so that the hub toothing (1 or 1.1) is not widened. Toothing widening leads to clamping of the rotors (5 and 5.1) on the hub (1 or 1.1) and therefore to brake malfunctions (recommended hub – shaft tolerance H7/k6).

  If the hub (1) is heated to make joining easier, the O-ring must first be removed and then re-mounted after hub installation.

  The max. joining temperature of 200 °C must not be exceeded.
- ❑ The O-rings on the hub (1 or 1.1) must be lightly greased.
- ❑ Rotors (5 and 5.1) and brake surfaces must be oil- and grease-free. A suitable counter friction surface (steel or cast iron) must be available. Sharp-edged interruptions on the friction surface are to be avoided.
  Recommended surface quality in the friction surface area: Ra = 1.6 µm.
  In particular customer-side attachment surfaces made of grey cast iron are to be rubbed down with fine sandpaper (grain ≈ 400).

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Table 2

Size	Rotor thickness new condition [mm]	Nominal air gap "a" per brake body [mm]	Maximum air gap* per brake body [mm]	Fixing screws with wrench openings and tightening torques					
				Items 8 and 8.1	SW	[Nm]	Item 12	SW	[Nm]
4	6	0,4 +/-0,07	0,6	3 x M4	7	3	3 x M4	3	3
8	7	0,5 +/-0,07	0,9	3 x M5	8	5	3 x M5	4	5
16	8,7	0,5 +/-0,07	1,1	3 x M6	10	10	3 x M6	5	10
32	9,95	0,5 +/-0,07	1,0	3 x M6	10	13	3 x M6	5	15
64	11,1	0,5 +/-0,07	0,9	3 x M8	13	30	3 x M8	6	36
100	12,5	0,5 +/-0,07	0,8	3 x M8	13	36	6 x M8	6	36
200	13,9	0,5 +/-0,07	1,0	3 x M10	16	71	6 x M10	8	71
300	13,9	0,5 +/-0,07	1,0	3 x M12	18	123	6 x M12	10	123
500	16	0,5 +/-0,07	0,9	6 x M12	18	123	6 x M16	14	200
800	18	0,5 +/-0,07	0,8	6 x M16	24	250	6 x M16	14	300
1300	18	0,5 +/-0,07	0,9	8 x M16	24	250	8 x M16	14	300
1800	18	0,5 +/-0,07	0,9	8 x M16	24	300	8 x M20	17	470

***** When the maximum air gap has been reached, the rotor must be replaced. However, the brake will already become louder at an air gap > "a" +0,2 mm.

Warning!
On brakes with reduced braking torque or during operation with overexcitation, braking function can no longer be guaranteed when air gap > maximum air gap.

Installation (Figs. 1, 2 and 4)

1. Dismantle the flange plate (11 / dependent on Type) from the brake or remove the shipping braces (Item 10 only up to size 500) from the hexagon head screws (8).
2. If necessary, mount the flange plate (11) using cap screws (12) onto the mounting surface (please observe the tightening torque according to Table 2).
3. Mount the hub assembly with the O-rings (Item 1 / **O-rings must be slightly greased)** onto the shaft and bring them into the correct position (the key should lie over the entire length of the hub), then secure axially (e.g. using a locking ring).
4. Push rotor 1 (5) by hand using light pressure over both O-rings (2) onto the hub (1) (the rotor collar should face away from the machine wall or flange plate).
   Make sure the toothing moves easily.
   Do not damage the O-rings.
5. Push brake body 1 over hub (1) and rotor collar of rotor 1 (5) (the fixing holes should align with the threaded holes in the flange plate (11) or machine wall).
   On sizes 500 to 1800:
   Insert 3 hexagon head screws (8.1 / for sizes 1300 and 1800 4 pieces), evenly spread out into brake body 1 and tighten evenly all round **using a torque wrench and tightening torque (acc. Table 2).**
6. Push rotor 2 (5.1) by hand using light pressure over an O-ring (2) onto the hub (1), so that the rotor 2 friction lining (5.1) lies against the brake body 1 (the rotor collar should face the machine wall or the flange plate).
   Make sure the toothing moves easily.
   Do not damage the O-rings.
7. Insert the hexagon head screws (8) into the bores in brake body 2, which are equipped with distance bolts (16), and then join them with brake body 1 (see Fig. 2) and screw them onto the machine wall or flange plate.
   Tighten the hexagon head screws (8) evenly all round **using a torque wrench and tightening torque (acc. Table 2).**
8. **Inspect air gap "a" according to Table 2**
   The nominal air gap must be present.

Brake Inspection (Before brake initial operation)

- **Braking torque inspection:**
  Compare the braking torque specified on order with the braking torque printed on the Type tag.
- **Carry out a release check:**
  by energising the brake or by activating it manually with the hand release (dependent on Type).
- **Carry out a release monitoring functional inspection:**
  see page 12 (dependent on Type).

Dual Circuit Brake Function Inspection

The ROBA-stop®-silenzio® brake has a doubly-safe (redundant) braking system.
If one brake circuit fails, the braking effect is still maintained.

Warning!
If the elevator starts to move after releasing one brake circuit, or if it does not slow down appreciably during the braking procedure, switch off the energised coil immediately.

The dual circuit braking function is not guaranteed.

Stop the elevator, dismantle the brake and inspect it.

The individual circuit inspection takes place by energising the individual circuits with nominal voltage; see Type tag (9).

Brake Circuit 1 Inspection:

1. Energise brake circuit 2.
2. Activate the emergency braking procedure and inspect the stopping distance according to the elevator directives.
3. De-energise brake circuit 2.

Brake Circuit 2 Inspection:

1. Energise brake circuit 1.
2. Activate the emergency braking procedure and inspect the stopping distance according to the elevator directives.
3. De-energise brake circuit 1.

Inspection of Both Brake Circuits:

Energise both brake circuits using nominal voltage, see Type tag (9).
Activate the emergency braking procedure and inspect the stopping distance according to the elevator directives.
The stopping distance must be much shorter than the stopping distance / individual circuit.

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Hand Release (Sizes 4 to 500)

The hand release is set and installed manufacturer-side!

Hand Release Installation (Figs. 7 and 7a) Manufacturer-side

In order to install the hand release, the brake must be dismantled and de-energised.

On the sizes 4 to 300, the installation procedure is different on brake bodies 1 and 2 (see Fig. 7).
If the brake is installed in the wrong order, it could fail.
On size 500, the installation procedure for brake bodies 1 and 2 (see Fig. 7a) is identical.

Installation onto Brake Body 1 (Sizes 4 to 300):

1. Screw the hand release rod (6.2) into the switch bracket (6.1) and secure using Loctite 243.
2. Insert the raised head screws (6.3) through the slot bores of the switch bracket (6.1).
   Please Observe: On sizes 32, 64 and 100, a washer should go between the screw head and the switch bracket (6.1).
3. Insert the raised head screws (6.3) with the switch bracket (6.1) into the bores on the coil carrier (3).
4. **Please ensure that the switch bracket (6.1) is in the correct position. The switch bracket (6.1) with the screwed-in hand release rod (6.2) must lie over brake body 1.**
5. Push the thrust springs (6.4) armature disk-side onto the raised head screws (6.3) and apply the hexagon nuts (6.5).
6. Tighten the hexagon nuts (6.5) evenly, until the specified adjustment dimension “Y” (Fig. 7 and Table 3) is reached.

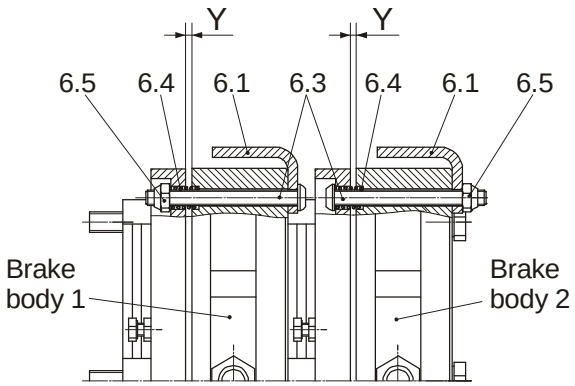

Fig. 7 (Sizes 4 to 300)

Table 3 (Adjustment Dimension and Hand Release Force)

Size	Dimension "Y"	Hand release force per lever
4	1,1 mm	35 N
8	1,5 mm	35 N
16	1,5 mm	110 N
32	1,5 mm	100 N
64	1,5 mm	130 N
100	1,5 mm	110 N
200	1,5 mm	200 N
300	1,5 mm	250 N
500	(1,5 mm)	300 N

Installation onto Brake Body 2 (Sizes 4 to 300):

1. Screw the hand release rod (6.2) into the switch bracket (6.1) and secure using Loctite 243.
2. Insert the thrust springs (6.4) onto the raised head screws (6.3).
3. Insert the raised head screws (6.3) with the mounted thrust springs (6.4) through the coil carrier (3) into the armature disk (4) bores.
4. Push the switch bracket (6.1) onto both the raised head screws (6.3) and apply the locking nuts (6.5).
   Please Observe! On sizes 32, 64 and 100, a washer should go between the switch bracket and the locking nut.
5. **Please ensure correct position of the switch bracket (6.1). The switch bracket (6.1) with the screwed-in hand release rod (6.2) must lie over brake body 2.**
6. Tighten the locking nuts evenly, until the specified adjustment dimension “Y” has been reached.

Installation onto Brake Bodies 1 and 2 (Size 500):

1. Screw out both hexagon nuts (6.5), including their washers, from the hand release assembly (6).
2. Insert the hand release assembly (6) with the mounted thrust springs (6.4) through the coil carrier (3) into the bores on the armature disk (4).
3. Re-apply both hexagon nuts (6.5 / secured with Loctite 243) including the washers.
4. **Tighten both hexagon nuts (6.5) evenly using a torque wrench and a tightening torque of 10Nm.**

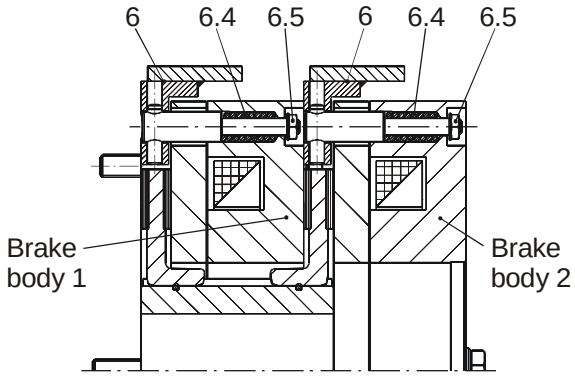

Fig. 7a (Size 500)

Hand Release (Sizes 800 to 1800)

The hand releases on sizes 800 to 1800 must only be installed and adjusted at the *mayr*® site of manufacture. As well as this, an **Additional Instruction Sheet B.8.7.H.GB** is included in the brake delivery.

Noise Damping

Important: Please Observe:

Replacement of damping elements is only permitted at the *mayr*® site of manufacture.

The noise damping has been set and adjusted manufacturer-side. However, dependent on application or operating conditions (torque adjustment, switching frequency, ambient conditions, inherent operating system vibrations etc.), the noise damping is subject to aging.

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Single Hand Release Option (not on sizes 300 to 1800)

The hand release is installed and adjusted manufacturer-side!

Additional Parts for Standard Hand Release

6.6 Bracket

6.7 Cap screw

Single Hand Release Installation (Figs. 7 and 8) Manufacturer-side

For installation of the single hand release, the brake must be dismantled and de-energised.

The installation procedure is different for brake bodies 1 and 2 (see Figs. 7 and 8). If the brake is installed in the wrong order, it could fail.

Single Hand Release Installation on Brake Body 1:

1. Screw in the bracket (6.6) with the cap screw (6.7) into the switch bracket (6.1) vertical to the switch bracket (6.1) as shown in Fig. 8, and secure with Loctite 243.
   Please observe the tightening torque according to Table 4!
2. Screw the hand release rod (6.2) into the bracket (6.6) and secure using Loctite 243.
3. Insert the raised head screws (6.3) through the slot bores of the switch bracket (6.1).
   Please Observe: On sizes 32, 64 and 100, a washer should go between the screw head and the switch bracket (6.1).
4. Insert the raised head screws (6.3) with the switch bracket (6.1) into the bores on the coil carrier (3).
5. **Please ensure that the switch bracket (6.1) is in the correct position. The switch bracket (6.1) with the screwed-in hand release rod (6.2) must lie over brake body 1 and the hand release rod (6.2) must face in the direction of the machine wall.**
6. Push the thrust springs (6.4) armature disk-side onto the raised head screws (6.3) and apply the hexagon nuts (6.5).
7. Tighten the hexagon nuts (6.5) evenly, until the specified adjustment dimension “Y” (Fig. 7 and Table 3) is reached.

Single Hand Release Installation onto Brake Body 2

1. Screw in the bracket (6.6) with the cap screw (6.7) into the switch bracket (6.1), vertical to the switch bracket (6.1) as shown in Fig. 8, and secure using Loctite 243.
   Please observe the tightening torques according to Table 4!
2. Screw the hand release rod (6.2) into the bracket (6.6) and secure using Loctite 243.
3. Insert the thrust springs (6.4) onto the raised head screws (6.3).
4. Insert the raised head screws (6.3) with the mounted thrust springs (6.4) through the coil carriers (3) into the armature disk bores (4).
5. Push the switch bracket (6.1) onto both the raised head screws (6.3) and apply the locking nuts (6.5).
   Please Observe! On sizes 32, 64 and 100, a washer should go between the switch bracket and the locking nut.
6. **Please ensure correct position of the switch bracket (6.1). The switch bracket (6.1) with the screwed-in hand release rod (6.2) must lie over brake body 2 and the hand release rod (6.2) must face away from the machine wall.**
7. Tighten the locking nuts evenly, until the specified adjustment dimension “Y” has been reached.

Table 4

Size	Tightening torque for cap screw Items 6.7 [Nm]
4	6
8	10
16	24
32	24
64	48
100	48
200	83

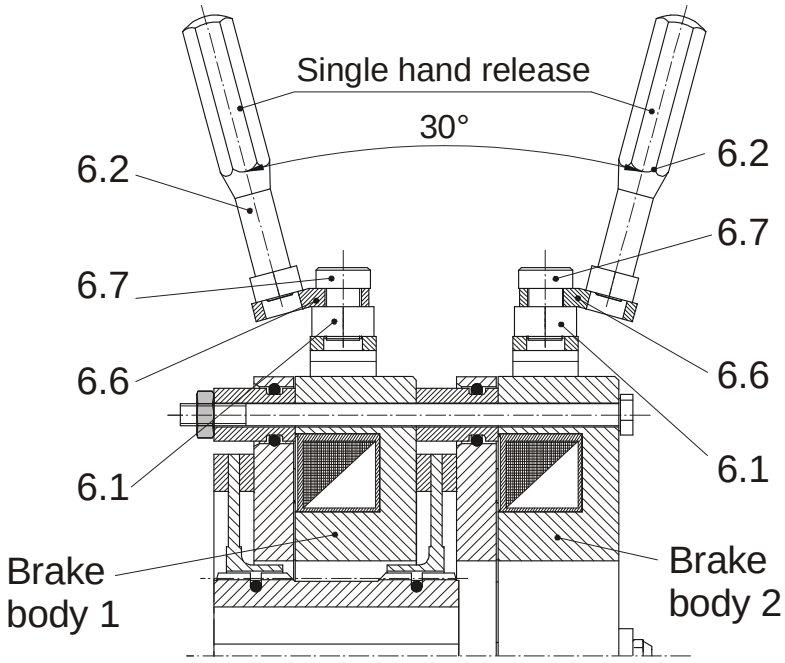

Fig. 8

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Deviations on Single Brake Design:

➢ Guidelines

The ROBA-stop®-silenzio® brake can also be ordered as a single brake.
In this case, the individual values for nominal braking torque, electrical nominal power and mass apply.

Please Observe!
Single brakes do <u>not</u> meet the demands acc. the EN81-1 standard or the BGV C1 (previously VGB 70), DIN 56925 and DIN 56921-11 for installation in elevators and theatre stage technical systems.

➢ Deviating Parts

Item 1.1: hub for single brake
(instead of Item 1)

On sizes 4 – 300:
Item 8.1: hexagon head screws for single brakes
(instead of Item 8)

➢ Function

The braking torque on brake body 1 (3) is produced via the pressure force of several thrust springs (14) using frictional locking between the two friction linings of the rotor (5), the armature disk 1 (4) and the flange plate (11) or machine wall.

➢ Installation (Figs. 1, 3 and 4)

1. Dismantle the flange plate (11 / dependent on Type).
2. If necessary, mount the flange plate (11) using the cap screws (12).
   (Observe the tightening torque acc. Table 2).
3. Mount the hub assembly with the O-ring (Item 1.1 / **O-ring must be lightly greased)** onto the shaft and bring them into the correct position. <u>Make sure that the key lies with its full length over the entire length of the hub,</u> and secure axially (e.g. using a locking ring).
4. Push the rotor (5) by hand using light pressure over the O-ring (2) onto the hub (1.1) <u>(The rotor collar should face away from the machine wall or flange plate (11).</u>
   Make sure that the toothing moves easily.
   Do not damage the O-rings.
5. Push brake body 1 over the hub (1.1) and the rotor collar of rotor 1 (5) (the fixing holes should align with the threaded holes in the flange plate (11) or machine wall).
6. Insert hexagon head screws (8.1), into brake body 1 and screw onto the machine wall or flange plate (11). Tighten the hexagon head screws (8.1) evenly all round **using a torque wrench and tightening torque (acc. Table 2).**
7. **Inspect air gap "a" according to Table 2:**
   the nominal air gap must be present.

➢ Hand Release Installation (Fig. 9) onto Brake Body (Sizes 4 to 300)

1. Screw the hand release rod (6.2) into the switch bracket (6.1) and secure with Loctite 243.
2. Insert the thrust springs (6.4) onto the raised head screws (6.3).
3. Insert the raised head screws (6.3) with the mounted thrust springs (6.4) through the coil carrier (3) into the bores on the armature disk (4).
4. Push the switch bracket (6.1) onto both the raised head screws (6.3) and apply the locking nuts (6.5).
   Please Observe! On sizes 32, 64 and 100, a washer should go between the switch bracket and the locking nut.
5. **Please ensure correct position of the switch bracket (6.1). The switch bracket (6.1) with the screwed-in hand release rod (6.2) must lie over brake body 1.**
6. Tighten the locking nuts evenly, until the specified adjustment dimension "Y" has been reached.

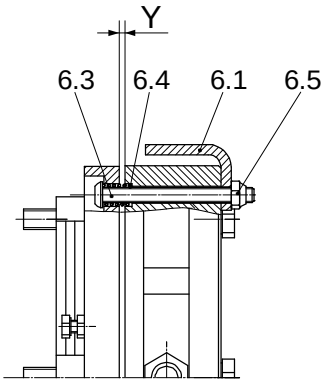

Fig. 9

➢ Hand Release Installation (Fig. 9a) onto Brake Body (Size 500)

1. Screw out both hexagon nuts (6.5), including their washers from the hand release assembly (6).
2. Insert the hand release assembly (6) with the mounted thrust springs (6.4) through the coil carrier (3) into the bores on the armature disk (4).
3. Re-apply both hexagon nuts (6.5 / secured with Loctite 243), including the washers.
4. **Tighten both hexagon nuts (6.5) evenly using a torque wrench and a tightening torque of 10 Nm.**

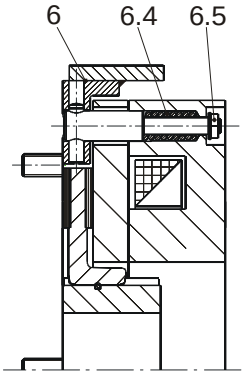

Fig. 9a

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Electrical Connection

DC current is necessary for brake operation. The coil voltage is indicated on the Type tag as well as on the brake body and is designed according to the DIN IEC 60038 (± 10 % tolerance). The device must be operated via DC voltage with low ripple content, e.g. via a bridge rectifier or another suitable DC supply. Dependent on the brake equipment, the connection possibilities can vary.

Please follow the exact connections according to the Wiring Diagram. The manufacturer and the user must observe the applicable directives and standards (e.g. DIN EN 60204-1 and DIN VDE 0580). Their observance must be guaranteed and double-checked!

Earthing Connection

The brake is designed for Protection Class I. This protection covers not only the basis insulation but also the connection of all conductive parts to the PE conductor on the fixed installation. If the basis insulation fails, no contact voltage will remain. Please carry out a standardized inspection of the PE conductor connections to all contactable metal parts!

Demands on the Supply Voltage

In order to minimise the noise development on released brakes, they may only be operated via DC voltage with low ripple content. Operation is possible with AC voltage using a bridge rectifier or another suitable DC supply. Supplies whose output voltage show a high ripple content (e.g. half-wave rectifiers, switch mode power supplies etc). are unsuitable for brake operation.

Device Fuses

To protect against damage from short circuits, please add suitable device fuses to the mains cable.

Switching Behaviour

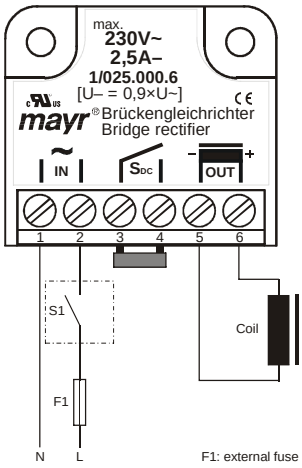
The operational behaviour of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk (4) and the coil carrier (3) (dependent on the wear condition of the linings).

Magnetic Field Build-up

When the voltage is switched on, a magnetic field is built up in the brake coil, which attracts the armature disk (4) to the coil carrier (3) and releases the brake.

Magnetic Field Removal

AC-side switching

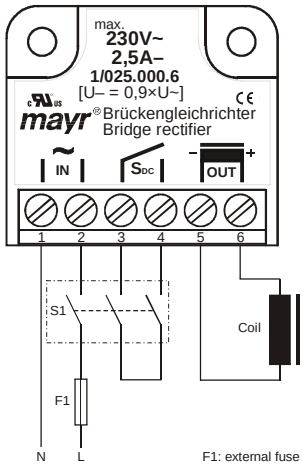


The power circuit is interrupted in front of the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

When switching times are not important, please switch AC-side, as no protective measures are necessary for coil or switching contacts.

→ **low-noise switching**; however, the brake engagement time is longer (c. 6-10 times longer than with DC-side switching). Use for non-critical brake times.

DC-side switching



The power circuit is interrupted between the rectifier and the coil as well as mains-side. The magnetic field reduces very rapidly, resulting in a rapid rise in braking torque.

When switching DC-side, high voltage peaks are produced in the coil, which lead to wear on the contacts from sparks and to destruction of the insulation.

→ **short brake engagement time (e.g. for emergency OFF operation)**; however, louder switching noises.

Protective Circuit

When using DC switching, the coil must be protected by a suitable protective circuit according to VDE 0580, which is already integrated in *mayr*-® rectifiers. To protect the switching contact from consumption when using DC-side switching, additional protective measures are necessary (e.g. series connection of switching contacts). The switching contacts used should have a minimum contact opening of 3 mm and should be suitable for inductive load switching. Please make sure on selection that the rated voltage and the rated operation current are sufficient. Depending on the application, the switching contact can also be protected by other protective circuits (e.g. *mayr*® spark quenching unit), although this may of course then alter the switching times.

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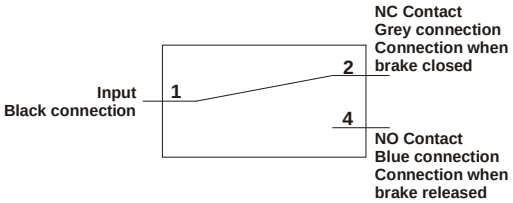
Release Monitoring (7) Fig. 10 (Dependent on Type)

The **ROBA-stop®-silenzio®** brakes are delivered with manufacturer-side adjusted release monitoring.
One microswitch (Item 7.1) per braking circuit signalizes each change in brake condition:
"brake open" or "brake closed"

A signal evaluation of both conditions must take place customer-side.
From the time when the brake is energised, a period of three times the separation time must pass before the release monitoring system microswitch signal is evaluated.

Wiring Diagram for each Microswitch (7.1):



Function

When the magnetic coil in the coil carrier (3) is energised, the armature disk (4) is attracted to the coil carrier (3), a microswitch (7.1) emits a signal and the brake is released.
Please Observe:
When the hand release (6) is being operated, a switching signal from the release monitoring (7) is not guaranteed.

Table 5: Maximum Switch Performance

AC-side switching performance		DC-side switching performance	
Voltage [VAC]	**Resistance load [A/R Load]**	**Voltage [VDC]**	**Resistance load [A/R Load]**
125	**5**	**up to 30**	**5**
		125	**0,5**
250	**5**	**250**	**0,25**

Minimum switch performance: 0,12VA (> 12V, > 10mA)
Contact material: silver

Installation and Adjustment per Brake Circuit (Manufacturer-side Fig. 10)

Please Observe!
The brake must be screwed onto the installation device with tightening torque according to Table 2, and the coil must be de-energised.

1. Join the hexagon head screw (7.3) with the hexagon nut (7.4) and the spring washer (7.5), paint the first part of the thread with Loctite 243 and screw into the armature disk (4).
2. Screw the microswitch (7.1) assemblies with the cap screws (7.2) to the partly-assembled brake bodies 1 and 2 (secure with Loctite 243).

Switch Adjustment

3. Turn the hexagon head screw (7.3) in the direction of the switch (7.1) up to the switch tappet.
4. Connect the inspection or measurement device (diode inspection) to the NO contact black/blue.
5. Insert the feeler gauge 0,1 mm (loose sensor plate) between the switch tappet (7.1) and the hexagon head screw (7.3).
6. Turn the hexagon head screw (7.3) in the direction of the switch (7.1) up to the **signal "ON"**, and then turn it back to the **signal "OFF".** Counter the hexagon head screw (7.3) with the hexagon nut (7.4).
7. Energise the brake → **Signal "ON"**
   De-energise the brake → **Signal "OFF"**
   If necessary, re-adjust and repeat the inspection.
8. Inspection with feeler gauge 0,15 mm
   Brake energised → **Signal "ON"**,
   Brake de-energised → **Signal "ON"**
9. Inspection with feeler gauge 0,10 mm
   Brake energised → **Signal "ON"**,
   Brake de-energised → **Signal "OFF"**
10. Feeler gauge 0,3 mm between the armature disk (4) and the coil carrier (3) in the area of the switch (7.1).
    Energise the brake; the **signal must be "ON".**
11. Paint items 7.4 and 7.2 with safety lacquer.

Customer-side Inspection after Mounting

The customer-side connection takes place as an NO contact
Please inspection the release monitors
Brake de-energised → Signal "OFF",
Brake energised → Signal "ON"

The microswitches cannot be guaranteed fail-safe. There must be a suitable entry point for replacement or adjustment.

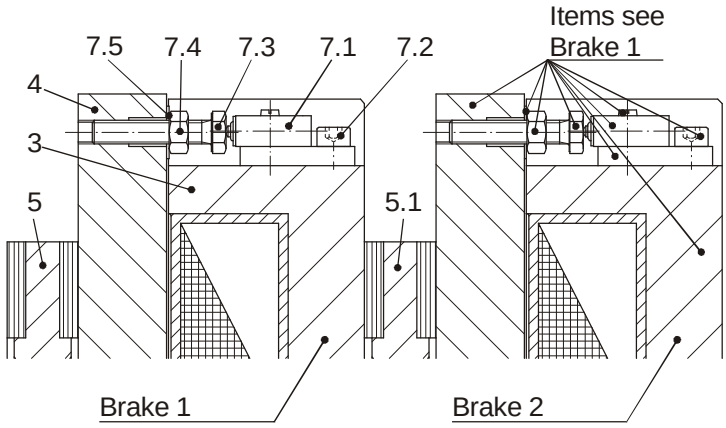


Fig. 10

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Maintenance

ROBA-stop®-silenzio® brakes are mainly maintenance-free. The friction linings are robust and wear-resistant. This ensures a particularly long service lifetime.
However, the friction linings are subject to functional wear on emergency OFF brakings. Therefore, the following inspections should be carried out at regular intervals:

- Braking torque or delay inspection (Individual brake circuit) (min. 1 x yearly)
- Inspection of air gap “a” braked (min. 1 x yearly

Inspection of the wear condition on the rotors 1 (5) and 2 (5.1) is carried out by measuring the air gap “a” (Fig. 2 and Table 2).
At the latest after reaching the maximum air gap, the rotors are to be replaced (Table 2).

Before the rotors are replaced (Items 5 and 5.1):

❒ Clean the brake, remove abraded particles (use an industrial vacuum cleaner / wear a dust mask)
❒ Measure the rotor thickness (new), the rotor thickness must be in accordance with Table 2

Replacing the rotors (Items 5 and 5.1)

The rotors are to be replaced by following the instructions for brake installation backwards.

Warning!
On hoist drives, the drive brake must be load-free, otherwise there is a danger of load crashes!

Disposal

Our electromagnetic brake components must be disposed of separately as they consist of different materials. Please observe the relevant authority regulations. Code numbers may vary according to the dismantling process (metal, plastic and cable).

Electronic components
(Rectifier / ROBA®-switch / Microswitch):

Products which have not been dismantled can be disposed of under the Code No. 160214 (Mixed Materials) or Components under Code No. 160216; or the objects can be disposed of by a certified waste disposal firm.

Brake bodies made of steel girders with coil / cable and all other steel components:
Steel scrap (Code No. 160117)

Aluminium components:
Non-ferrous metals (Code No. 160118)

Brake rotors (steel or aluminium girders with friction linings):
Brake linings (Code No. 160112)

Seals, O-rings, V-seals, elastomere, terminal boxes (PVC):
Plastics (Code No. 160119)

Malfunctions / Breakdowns:

Malfunctions	Possible Causes	Solutions
Brake does not release	❑ Incorrect voltage on the rectifier	❑ Apply correct voltage
	❑ Air gap too large (worn rotor)	❑ Replace rotor
	❑ Interrupted coil	❑ Replace brake
Delayed engagement of brake on emergency OFF	❑ Brake is switched AC-side	❑ Switch DC-side

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